Kodiak Management Area Salmon Catch and Escapement Sampling Operational Plan, 2015

by

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and

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Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	$(F, t, \chi^2,$ etc.$)$
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

REGIONAL OPERATIONAL PLAN CF.4K.2015.16

**KODIAK MANAGEMENT AREA SALMON CATCH AND ESCAPEMENT
SAMPLING OPERATIONAL PLAN, 2015**

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Project Leader(s):	M. Birch Foster, Fisheries Biologist III
	Michelle Wattum, Fisheries Biologist II
Division, Region and Area:	Division of Commercial Fisheries, Region IV, Kodiak
Project Nomenclature:	
Period Covered:	June–September 2015
Field Dates:	May–September
Plan Type:	Category II

Approval

Title	Name	Signature	Date
Project Leader	M. Birch Foster	M. Birch Foster	5/4/15
Biometrician	David Barnard	David P. Barnard	4 May 2015
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i

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

PURPOSE

The purpose of this project is to provide biological data (representative scales for age determination, length, and sex) from commercial salmon harvest and escapements to assist with the inseason and long-term management of salmon in the Kodiak Management Area (KMA).

The Alaska Department of Fish and Game (ADF&G) Division of Commercial Fisheries annually samples sockeye salmon escapements and harvest in the KMA. Weirs are the primary mode of enumeration for sockeye salmon *Oncorhynchus nerka* escapements into streams. Biological information such as age, sex, and length are collected from escapements in the Karluk, Ayakulik, Upper Station, Frazer, Afognak (Litnik), Saltery, Pasagshak, and Pauls Bay systems. In 1985, an expanded commercial salmon harvest (catch) sampling operation was initiated in the KMA that, in combination with the escapement sampling, provides the foundation for preseason run forecasts, escapement goal evaluation, and assignment of the run to stock of origin (run reconstruction). Commercial sockeye salmon harvest in the KMA will be sampled for age from individual districts and sections throughout the 2015 season. The overall goal of the project is to provide data to assist with the inseason and long-term management of the KMA sockeye salmon runs.

Key words: Kodiak, weirs, sockeye salmon, *Oncorhynchus nerka*, escapement, sampling, age, length, sex, catch, scales, operational plan

BACKGROUND

The western portion of Gulf of Alaska waters surrounding the Kodiak Island Archipelago and waters adjacent to the Alaska Peninsula from Cape Douglas to Kilokak Rocks comprise the KMA (Figure 1).

There are about 800 anadromous salmon streams (systems) located throughout the KMA (Johnson and Klein 2009). These systems support 5 commercially important salmon species: Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, coho *O. kisutch,* pink *O. gorbuscha*, and chum *O. keta* salmon. About 39 of these systems support various sizes of sockeye salmon runs (Jackson and Keyse 2013). Weirs operated by the ADF&G provide the primary mode of enumeration for virtually all Chinook salmon and a majority of the sockeye salmon escapements into KMA streams (Figure 2; Fuerst 2015). The remaining streams are monitored by aerial and foot surveys to index sockeye, pink, chum, and coho salmon escapements (Jackson and Keyse 2013).

The KMA is composed of 7 commercial salmon fishing districts (Figure 1) and 56 sections. The primary emphasis of the ADF&G salmon management program is to promote maximum sustainable production for future KMA salmon returns by supporting salmon escapements of sufficient magnitude and temporal and geographic distribution (Jackson 2015). Simultaneously, the goal is to provide for orderly fisheries, maximize harvest opportunities and product quality, and adhere to management plans adopted by the Alaska Board of Fisheries (BOF).

The BOF has approved area salmon management plans for the Cape Igvak Section of the Mainland District, Alitak District, North Shelikof Strait, Westside Kodiak, Eastside Afognak, Crescent Lake, Spiridon Lake, Eastside Kodiak, Mainland District, and North Afognak/Shuyak Island (5AAC 18.360-5AAC 18.369). The intent of these plans is to maintain traditional commercial fishing opportunities and subsequent harvest allocations, conserve stocks, and provide for a high-quality salmon product.

Five species of salmon are commercially harvested within the KMA, all of which have established escapement goals. The history of the "targeted" escapement goals for KMA salmon may be found in the area escapement goal team report (Sagalkin et al. 2013). Directed commercial fisheries occur on sockeye, pink, chum, and coho salmon; Chinook salmon are not targeted. To open and close the fishery in season, managers utilize qualitative analyses of run timing, catch-per-unit-effort (CPUE) statistics, species composition estimates, regulatory management plans, aerial survey estimates, test fishery numbers, and weir escapement counts (Jackson and Keyse 2013).

Age, sex, and length (ASL) composition data of KMA sockeye salmon escapements have been collected under the direction of various researchers and agencies since the mid-1920s. In 1985, ADF&G Division of Commercial Fisheries initiated an expanded commercial harvest (catch) and escapement sampling program focusing on sockeye salmon. The purpose of this program was to collect representative ASL data from major sockeye salmon systems as well as representative age data from selected commercial sockeye salmon harvest. These data continue to expand the KMA salmon ASL database. The data has been used to reconstruct numerous sockeye salmon runs by employing age marker analysis, scale pattern analysis (SPA), and historical harvest proportions to estimate specific stock contributions to commercial fisheries in the KMA (Swanton 1992; Barrett and Nelson 1994, 1995; Nelson and Swanton 1996, 1997; Nelson 1999; Sagalkin 1999; Baer and Honnold 2002; Witteveen et al. 2005; Foster 2006–2010; Moore 2012–2014, Wattum *In Prep*). Accordingly, ASL data collected provides the foundation for preseason run forecasting and escapement goal evaluation.

OBJECTIVES

PRIMARY OBJECTIVES

Data derived from sampling of the KMA commercial salmon catch and escapement will be used to achieve six primary objectives:

1. Estimate the age and sex compositions of sockeye salmon escapement in KMA systems.

2. Estimate the age composition of sockeye salmon catch in major KMA harvest areas.

3. Estimate mean length-at-age and sex for sockeye salmon escapement in KMA systems.

4. Construct accurate brood tables.

5. Develop accurate run forecasts.

6. Evaluate escapement goals and run timing.

SECONDARY OBJECTIVES

In addition to meeting the objectives listed above, this operational plan will serve as the source for all Westward Region adult and smolt sampling procedures (Appendix A).

METHODS

GENERAL DATA COLLECTION

The standard procedures for collecting and recording salmon ASL data are defined in Appendix A. During the 2015 season, data recording will be accomplished with netbook computers and/or tablets (iPads). All field crews will be provided new equipment and sampling

protocols as new hardware and software become available. Until that time, Appendix A will serve as the standard.

The accuracy of the data and scale-sample quality will be the responsibility of the crew leaders. It is essential that all samples are representative of desired areas. Bias will be avoided by randomly selecting fish; fish should not be preselected based upon size, sex, condition, or any other factor. If questions or problems arise, the project leader should be contacted immediately for clarification or assistance.

All scales, when possible, will be collected from the preferred area of each fish following the methods described by International North Pacific Fish Commission (1963). Scales will be mounted on scale "gum" cards and impressions made on acetate/diacetate cards (Clutter and Whitesel 1956). Fish ages will be assigned by examining scale impressions for annual growth increments using a microfiche reader fitted with a 60X lens following designation criteria established by Mosher (1968).

ESCAPEMENT SAMPLE SIZE

At major sockeye salmon systems (Karluk, Ayakulik, Upper Station, and Frazer; Table 1), weekly sockeye salmon escapement sampling, typically using a "Scott" 6-panel live box trap (Figure 3), for ASL will be conducted to meet strata goals. The strata coincide with the generally early (through 7/15) and late (post 7/15) temporal components typical of the major Kodiak Island sockeye salmon stocks. Sampling crews at major systems will sample between 40 and 200 fish each statistical week (1 to 3 times per week on alternating days) to provide a representation of weekly escapement and meet a goal of 600 fish per early and late strata (Table 1). Weekly sample goals will be determined by the individual weir crew leader with greater sampling intensity during the peak of escapement and less near the tails (e.g. between 40 and 80 fish weekly when escapement is low and between 120 and 200 fish when escapement is high). The sample size was constructed to permit each age class proportion estimate to be within at least 0.05 of the true proportion with 95% confidence for each stratum (Thompson 1987). Sample sizes were set with the assumption that at least 85% of the scale samples will be readable. Obtaining scale samples of the highest quality will increase the percentage of readable scales and the accuracy of the estimates. During 2015, the sampling week will start on Sunday and end on Saturday. Sampling weeks and corresponding calendar dates are listed in Appendix A1.

For the minor systems (Afognak, Pauls Bay, Saltery and Pasagshak systems, a minimum of 600 sockeye salmon will be sampled annually (Table 1) with the effort distributed throughout the season and proportional to escapement counts (i.e., peaks in sampling effort will occur during peaks of escapement). The sample size was constructed to permit each age class proportion estimate to be within at least 0.05 of the true proportion with 95% confidence (Thompson 1987). Sample sizes were set with the assumption that at least 85% of the scale samples will be readable. Afognak and Pauls Bay are early run sockeye salmon systems and a majority of the sampling intensity will occur in the early stratum. Saltery and Pasagshak are generally middle runs and therefore sampling intensity will be evenly distributed between the early and late strata. Please refer to the appropriate field operational plan specific to Afognak (Thomsen and Estrada 2014), Pauls Bay (Richardson 2015a), Pasagshak (Witteveen 2015), and Saltery (Estrada 2013).

CATCH SAMPLE SIZE

Selected sockeye salmon catches will be sampled for age (scales) on a weekly basis during commercial fishery openings by the KMA salmon catch sampling crew and several field crews according to the sampling schedule (Table 2). To ensure that samples are obtained, the crews will begin sampling on the first day of delivery (or harvest) during the designated sampling week (Appendix A1). Each crew leader should review the 2015 Kodiak Commercial Salmon Fishery Harvest Strategy (Jackson 2015) and become familiar with the basic management chronology and terminology.

Local and remote processing facilities (Kodiak, Larsen Bay, and Alitak) within the KMA will be contacted by phone daily to assess the potential arrival of tender and fishing vessels offloading salmon from areas prescribed to be sampled.

All catch samples are to be random, representative, and without known bias. Deliveries containing fish harvested from non-targeted areas and deliveries containing loads of mixed origin (< 90% pure by weight) are not to be sampled. There will be no pre-selection of fish for length, sex, condition, or any other factor.

The sample size for each of the major harvest areas (Table 2; Figures 4–6) is a strata goal of 600 fish (excluding Special Harvest Areas) when commercial harvest allows. Generally this equates to a weekly sample goal of roughly 80 to 200 fish but dependent on variable fishing schedule common to the management area. The sample size was constructed to permit each age class proportion estimate to be within at least 0.05 of the true proportion with 95% confidence, (Thompson 1987). Sample sizes were set with the assumption that at least 85% of the scale samples will be readable. Typically the percentage of readable scales is greater than 85%. Obtaining scale samples of the highest quality will increase the percentage of readable scales and increase the accuracy of the estimates

The Waterfall and Foul bays Special Harvest Areas (SHA; Figure 7) will be sampled opportunistically for sockeye salmon scales (Richardson 2015*b*) These areas have a limited timeframe and salmon harvest magnitude and thus a reduced sampling goal size. The Kitoi Bay and Spiridon Bay SHAs will be sampled by Kodiak Regional Aquaculture Association (KRAA) in 2015.

AGE DETERMINATION

The most common method of age determination in Pacific salmon is the analysis of the concentric rings (circuli) on the scale and is the method to be used by this project. Fast summer growth results in wide spacing between circuli, whereas slow winter growth results in closer-spaced circuli; age is determined by enumerating the number of winters observed on the scale (Gilbert 1913). This method of age determination is ideal because the scale can be collected, processed, and aged rapidly without mortality. Problems encountered using scales for age determination include variable scale growth, scale regeneration, scale reabsorption, and age validation difficulties (Beamish and McFarlane 1983). While no true age validation will be performed, a subsample of catch and escapement salmon scales will be aged by separate readers for corroboration of age estimates.

Ages will be recorded using European notation (Koo 1962), with a decimal separating the number of winters spent in fresh water (after emergence) from the number of winters spent in

salt water. All age data will be recorded directly into the database via the Kodiak intranet salmon aging utility using a programmable keyboard (X-keys).

AGE AND SEX COMPOSITION

Estimated age composition of the escapement or catch will be calculated daily as a group of proportions (p_i) characterizing a multinomial distribution: $\hat{p}_i = n_i / n$, where n = the number in the sample and n_i = the number in the sample of age i. On days where escapement or catch occurs but no samples are collected, proportions will be estimated by linear interpolation between sampling events. Estimated proportions will be multiplied by the corresponding daily escapement or catch estimate and summed over the stratum. Estimated sex composition will be calculated in a similar manner. Standard error of the age proportions will be calculated as the square root of estimated variance of a proportion (Thompson 1987).

DATA REPORTING

KMA weir crew leaders **WILL NOTIFY** their supervisors, via Single Side Band (SSB) radio or satellite telephone, of **daily** sampling results. Field camp personnel will send completed samples back to Kodiak on return freight flights. Packages should be clearly labeled to include: system, sample dates, and Attn: Michelle Wattum (or the assigned project biologist). The pilot should be instructed to call Fish and Game at 486-1855 for package pick-up.

When catch samplers are sampling at remote locations (e.g., Larsen Bay) they will report primarily to Michelle Wattum by phone on a daily basis. The Port of Kodiak catch sampling crew will be responsible for pressing and aging all sockeye salmon scale samples (including escapement), updating the weekly sampling log, and cataloging all catch- and escapement-sampling data. Only those personnel who pass the 2015 Westward Region scale-aging test will be authorized to age the samples.

Data from both the catch and escapement samples in 2015 will be compiled and published by Michelle Wattum in the 2015 Kodiak Management Area Catch and Escapement Sampling Results report that will be published around February of 2016. Descriptions of component programs used to compute age, length, and sex composition summaries can be found in database end user documentation (Unpublished ADF&G Commercial Fisheries Division database documentation, Neil Moomey 2015, Kodiak, Alaska).

SCHEDULE AND DELIVERABLES

Date	Activity
June 1–September 30	Sampling
June 1–October 31	Scale Aging
February 2016	Results published in Kodiak Management Area Salmon Escapement and Catch Sampling Results, 2015

RESPONSIBILITIES

Westward Region finfish research biologists M. Birch Foster and Michelle Wattum oversee data collection. Michelle Wattum will act as overall project leader of commercial catch sampling and supervise inseason progress. KMA research and management biologists will supervise escapement sampling crews (Table 1). The Kodiak catch sampling crew leader Molly McFarland (Fishery Biologist I) will monitor weekly escapement sampling and review incoming data for quality, quantity, and timeliness. A logbook will be maintained by crew leaders to track weekly samples. Crew leaders will be given periodic feedback regarding data quality.

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TABLES AND FIGURES

Table 1.–Kodiak Management Area sockeye salmon escapement sampling schedule, 2015.

Sample Location	Crew Supervision	Stream Number	weekly target [a]	Strata Early 6/1–7/15	Late 7/16–9/30	Total
Major Systems						
Karluk River weir	Spalinger	255-10-101	40 to 200	600	600	1,200
Ayakulik River weir	Spalinger	256-15-201	40 to 200	600	600	1,200
Upper Station weir	Anderson	257-30-304	40 to 200	600	600	1,200
Frazer Lake fish pass	Ruhl	257-40-403	40 to 200	600	600	1,200
Minor Systems						
Afognak (Litnik) weir	Ruhl	252-34-342	40 to 120	460	140	600
Saltery Lake weir	Richardson	259-41-415	40 to 120	360	240	600
Pasagshak River weir	Witteveen	259-43-411	40 to 120	360	240	600
Pauls Lake weir	Richardson	251-85-831	40 to 120	460	140	600

[a] The weekly targeted sample size will be determined by the crew leader and based on escapement magnitude; please refer to the *Escapement Sample Size* section within the text.

Table 2.–Kodiak Management Area salmon catch sampling schedule, 2015.

District Geographic Area	District or Sections	Primary Sampling Site	weekly target [a]	Strata		Total
				Early 6/1–7/15	Late 7/16–9/30	
NW Kodiak District						
Uganik-Kupreanof	253	Kodiak	80 to 200	600	600	1,200
Uyak Bay	254	Larsen Bay	80 to 200	600	600	1,200
Alitak District						
Cape Alitak/Humpy Deadman	257-10,20,50,60,70	Alitak	80 to 200	600	600	1,200
Moser/Olga	257-40 - 257-43	Alitak	80 to 200	600	600	1,200
SW Kodiak District						
Karluk/Sturgeon	255-10 - 255-20; 256-40	Larsen Bay	80 to 200	600	600	1,200
Ayakulik/Halibut Bay	256-10 - 256-30	Larsen Bay/Alitak	80 to 200	600	600	1,200
Total				3,600	3,600	7,200

[a] The weekly targeted sample size will be determined by the crew leader and based on weekly nature of the commercial fishery; please refer to the *Catch Sample Size* section within the text.
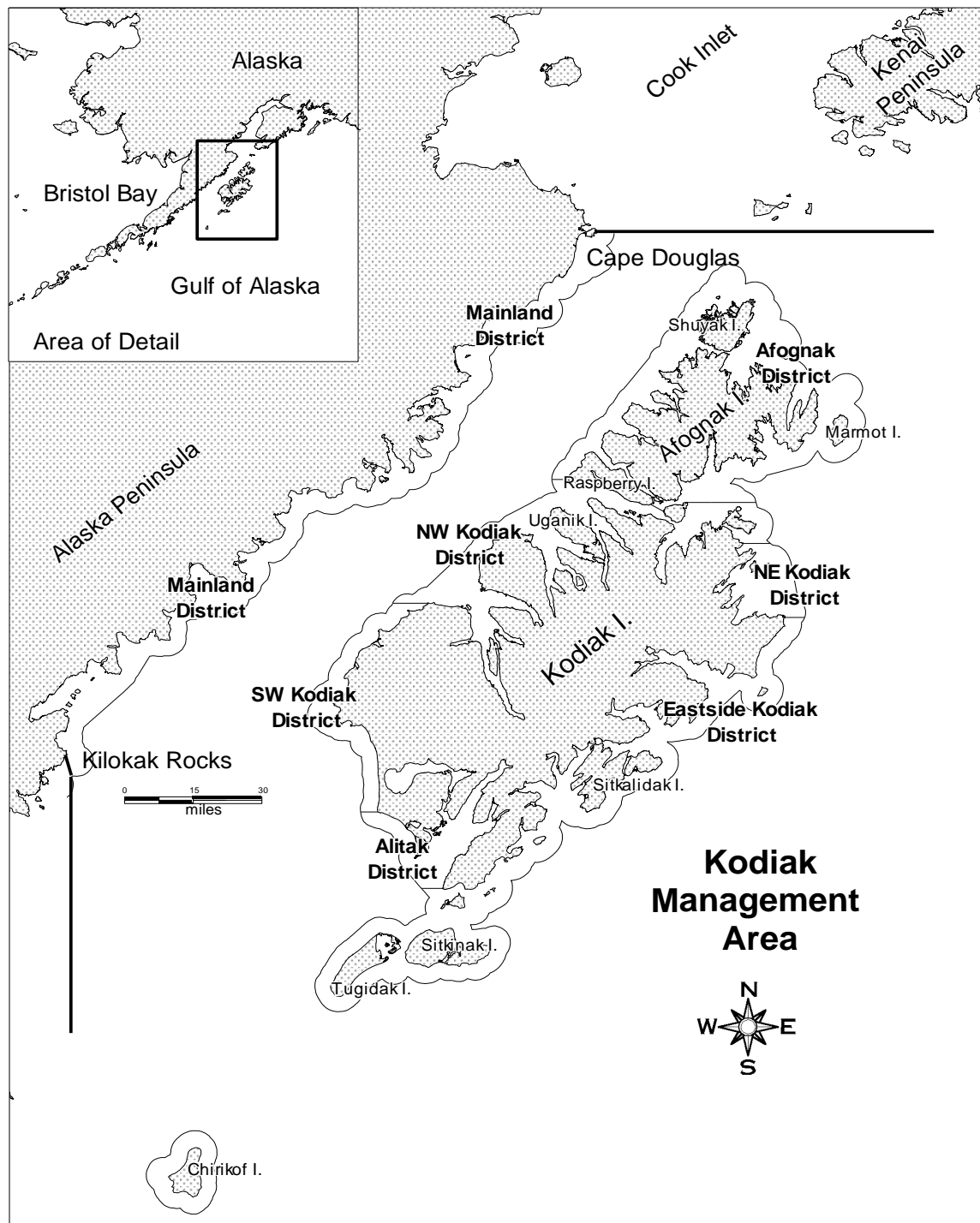
Figure 1.–Map depicting the Kodiak Island Archipelago and the Kodiak Management Area commercial salmon fishery districts, 2015.
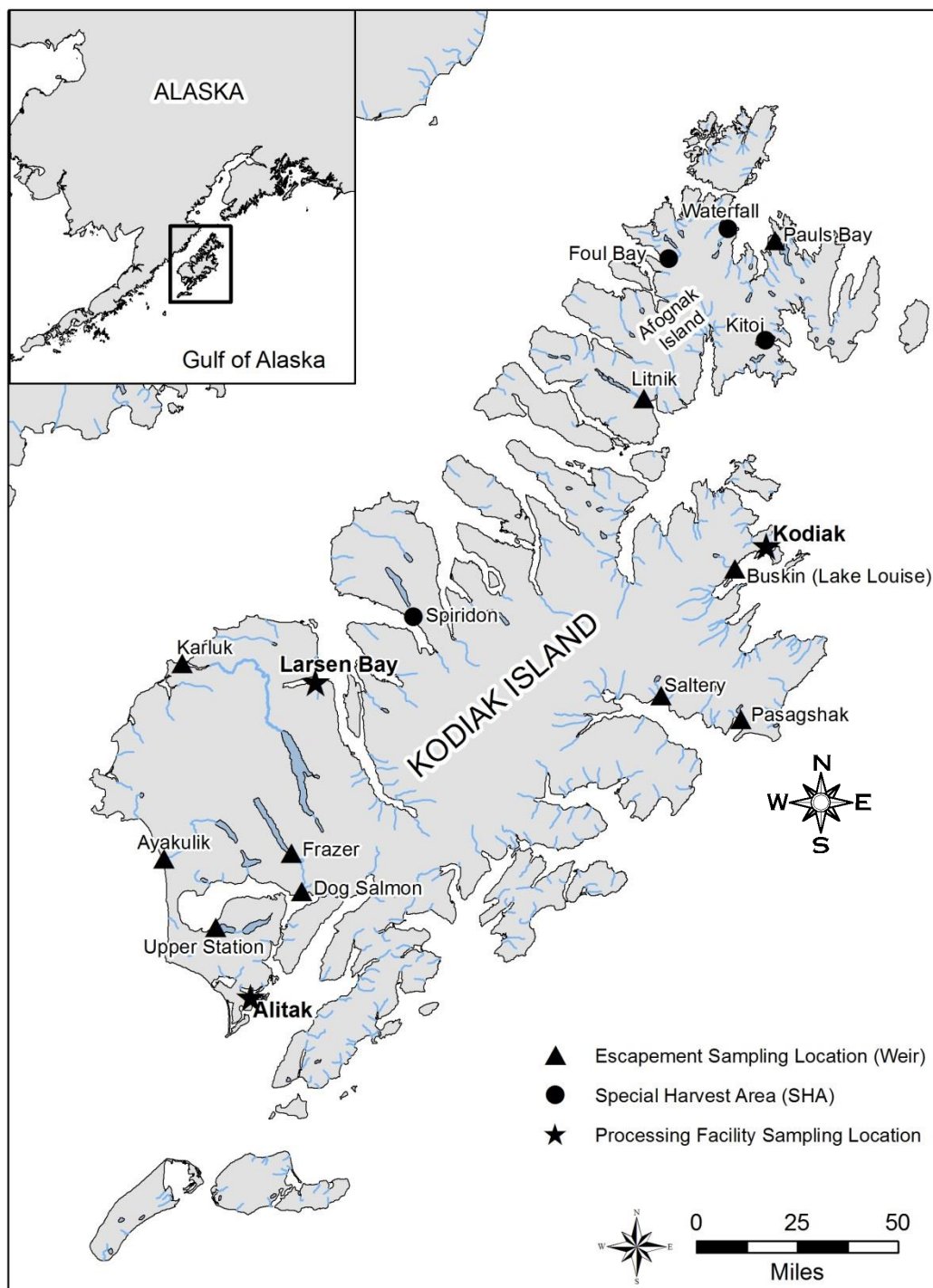
Figure 2.–Kodiak Management Area salmon weirs, special harvest areas, and salmon processing facility locations during 2015.

Figure 3.–The "Scott" 6-panel adult salmon live box trap (photo taken at Upper Station weir).

Figure 4.–Map depicting the Kodiak Management Area Northwest District.

Figure 5.–Map depicting the Kodiak Management Area Alitak District.

Figure 6.–Map depicting the Kodiak Management Area Southwest Kodiak District.
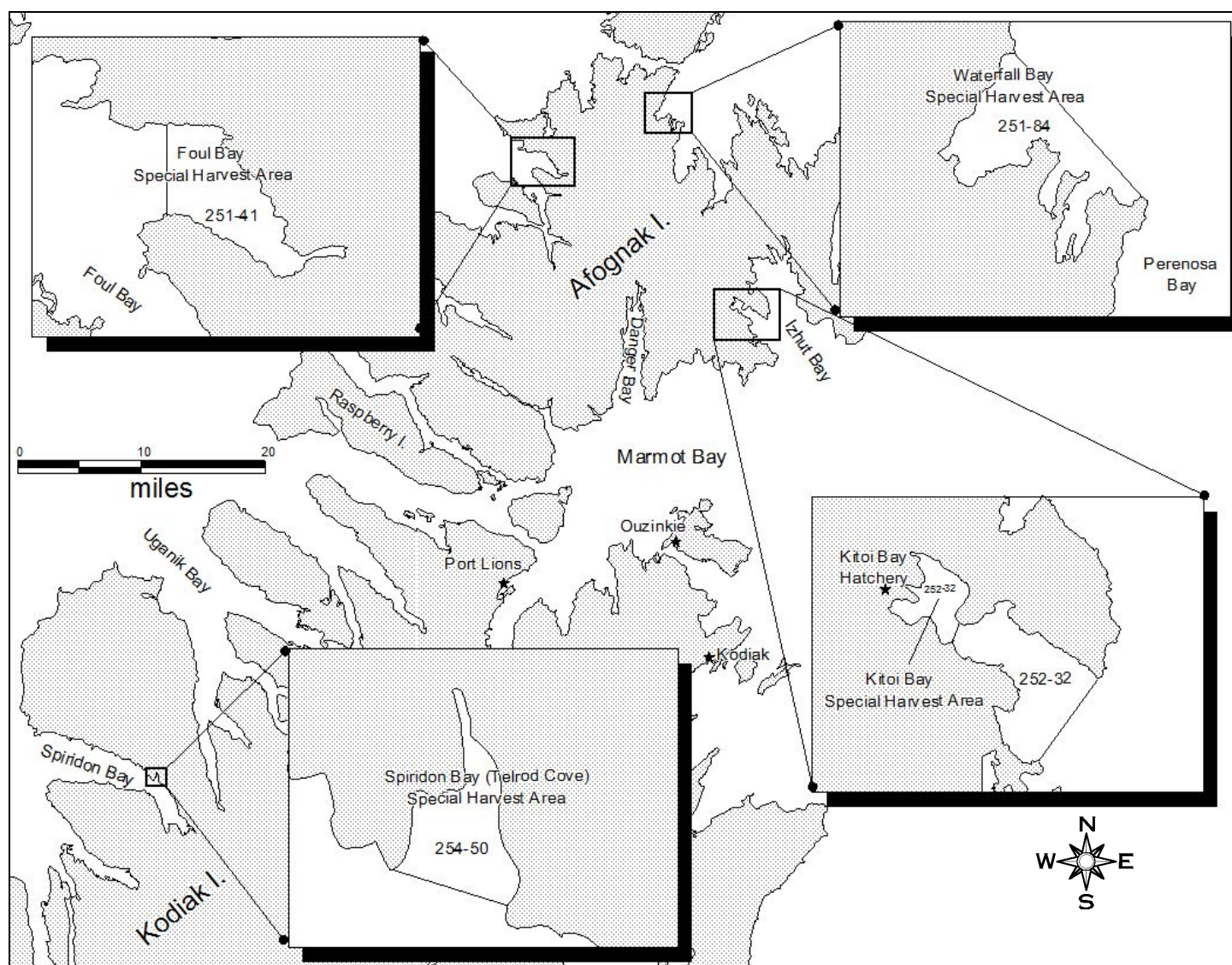
Figure 7.–Kodiak Management Area commercial salmon statistical areas sampled to represent Special Harvest Areas (SHA) at Waterfall, Foul, Kitoi, and Spiridon bays.

APPENDIX A. SAMPLING PROCEDURES

Appendix A1.–Statistical (sampling) weeks and associated calendar dates.

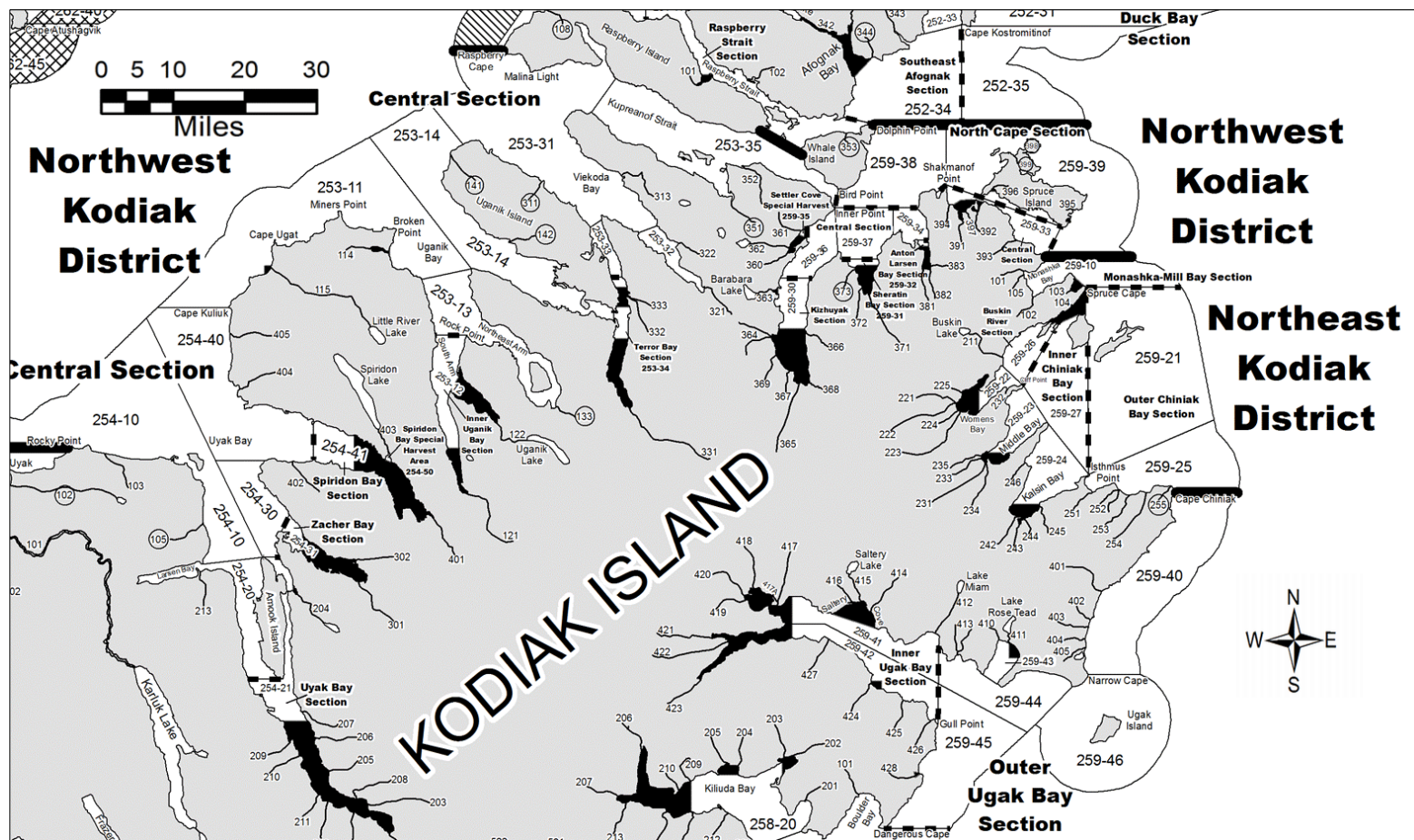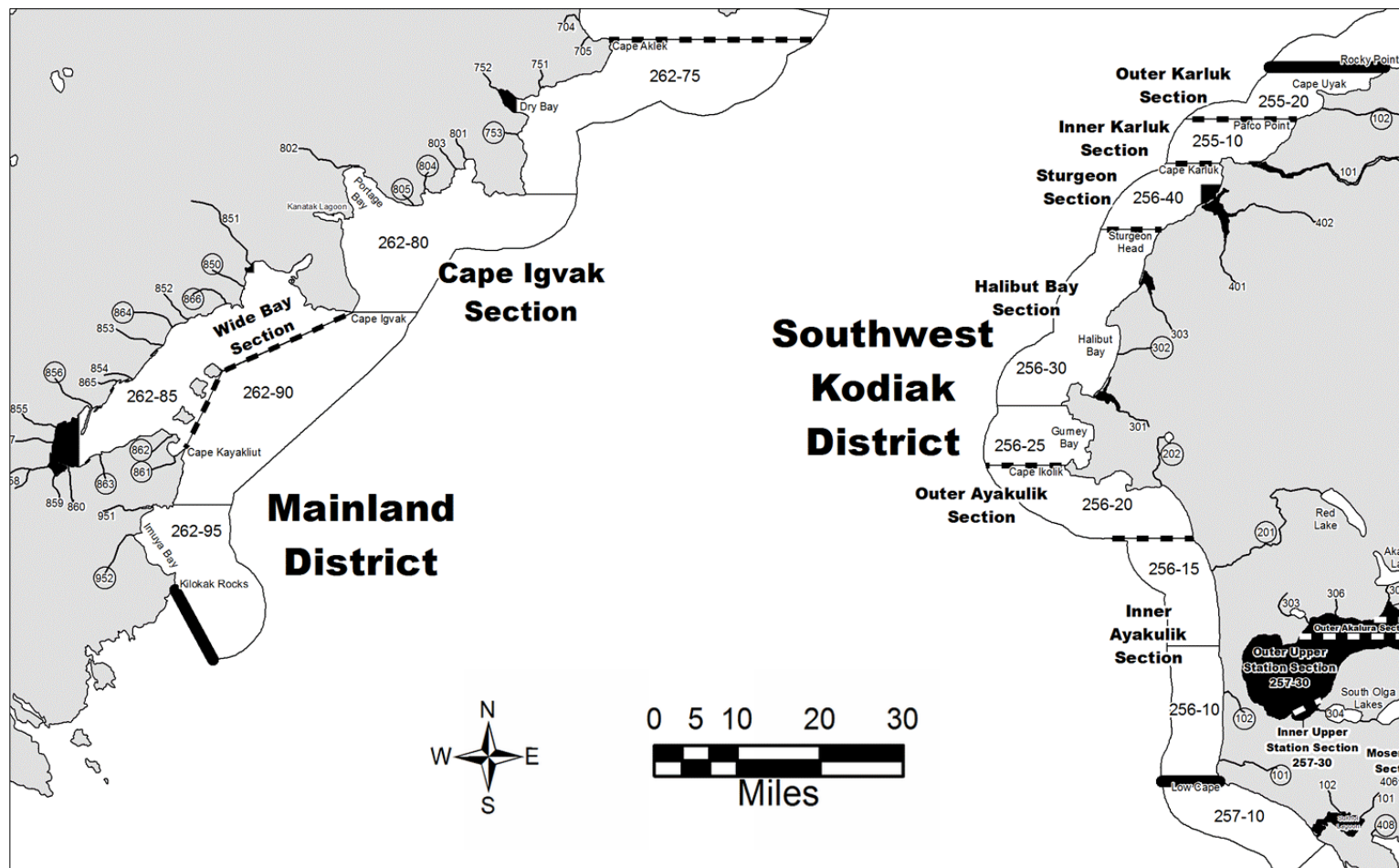| Week	Calendar Dates	Week	Calendar Dates
10	1-Mar – 7-Mar	28	5-Jul – 11-Jul
11	8-Mar – 14-Mar	29	12-Jul – 18-Jul
12	15-Mar – 21-Mar	30	19-Jul – 25-Jul
13	22-Mar – 28-Mar	31	26-Jul – 1-Aug
14	29-Mar – 4-Apr	32	2-Aug – 8-Aug
15	5-Apr – 11-Apr	33	9-Aug – 15-Aug
16	12-Apr – 18-Apr	34	16-Aug – 22-Aug
17	19-Apr – 25-Apr	35	23-Aug – 29-Aug
18	26-Apr – 2-May	36	30-Aug – 5-Sep
19	3-May – 9-May	37	6-Sep – 12-Sep
20	10-May – 16-May	38	13-Sep – 19-Sep
21	17-May – 23-May	39	20-Sep – 26-Sep
22	24-May – 30-May	40	27-Sep – 3-Oct
23	31-May – 6-Jun	41	4-Oct – 10-Oct
24	7-Jun – 13-Jun	42	11-Oct – 17-Oct
25	14-Jun – 20-Jun	43	18-Oct – 24-Oct
26	21-Jun – 27-Jun	44	25-Oct – 31-Oct
27	28-Jun – 4-Jul	45	1-Nov – 7-Nov

Adult Sampling Procedures

Position Salmon

Place the salmon on its right side (the head should facing toward the left).

Measure the length

Adult salmon length is measured from mid-eye to tail fork because the shape of the salmon's snout changes as it approaches sexual maturity. Slide the fish in place so that the middle of the eye is in line with the edge of the meter stick and hold the head in place with your left hand. Flatten and spread the tail against the board with your right hand. Read and record the mid-eye to tail fork length to the nearest millimeter. Please look at Figure 1.
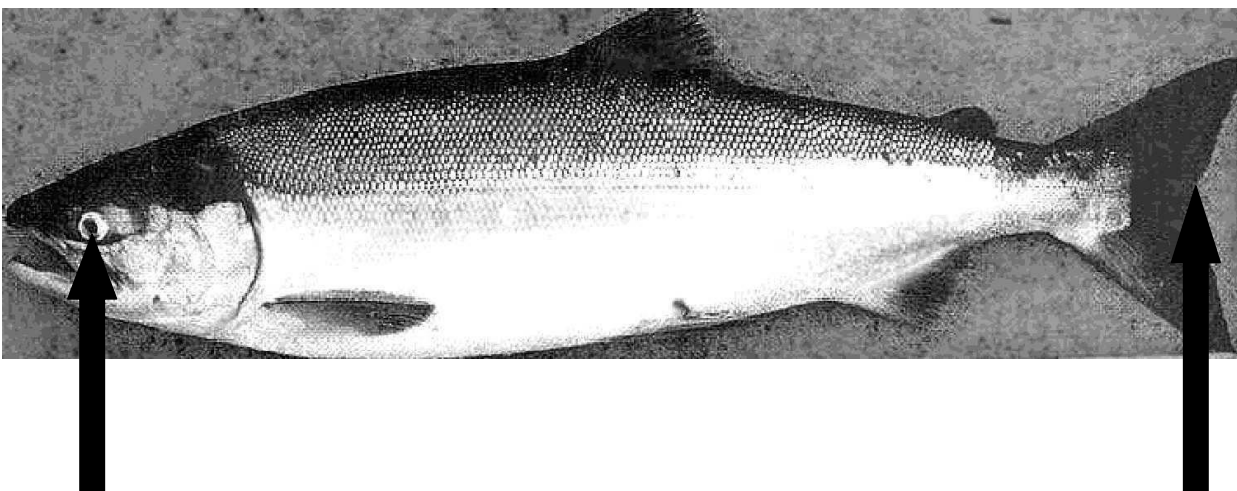
Figure 1.–Measuring fish length from mid-eye to tail fork.

Sex

The determination of the sex of the fish is typically done by examining external characteristics of the salmon.

Remove the preferred scale and place on scale card

The preferred scale is located 2 rows up from the lateral line, on a diagonal from the insertion (posterior) of the dorsal fin toward the origin of the anal fin (Figure 2). Samplers should be careful to make sure that the scale is not flipped over before it is placed on the scale card. The preferred scale should be properly placed on a labeled scale (gum) card (Figures 2 and 3). Scale cards should be labeled as soon as possible. If sampling commercial catch, write the date the fish were caught on the card instead of the sampling date.

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Area A is the preferred area. If scales on the left side are missing, try the right side. Area B is the second choice if there are no scales in Area A on either side of the fish. Area C designates non-preferred areas.

Do not turn scale over.

The preferred scale in the diagram is solid black. It is located 2 rows up from the lateral line, on a diagonal from the insertion (posterior) of the dorsal fin "back" toward the origin of the anal fin.

Figure 2.–Removal and placement of the preferred salmon scale onto the scale card.

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24
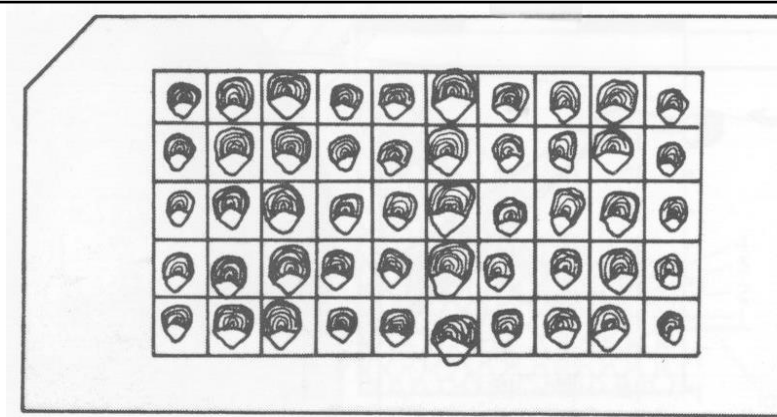
The scales are all correctly oriented on the card in the same direction, with the anterior portion of the scale pointed toward the top of the card and the posterior portion (which is that portion of the scale held in the forceps) pointed toward the bottom of the card.
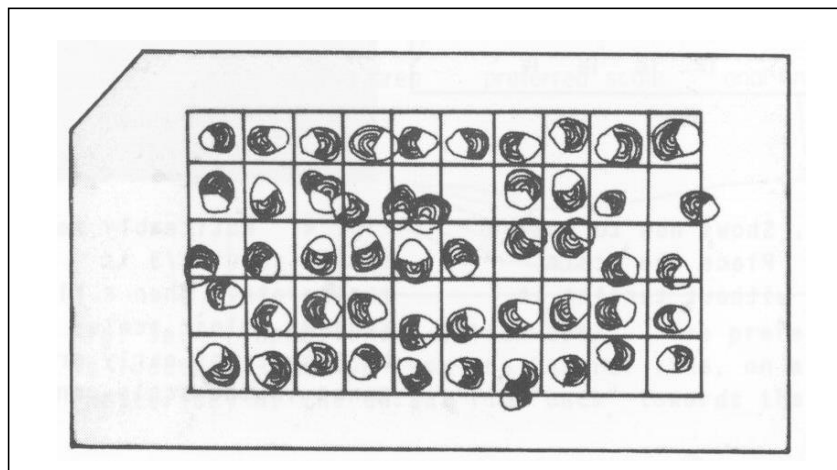
The scales are incorrectly oriented in different directions. This increases the time spent to age samples.

Figure 3.–Scale orientation on scale card.

Smolt Sampling Procedures

Label Slides

The left portion of each slide should be labeled prior to sampling using a permanent marker with the slide number, species, area sampled, date, and fish numbers (Figure 1).

Slide number

Write the number of the slide. This is typically sequential throughout the season.

Species

Write out completely (e.g., Sockeye).

Area sampled

Write the area where the fish were collected.

Sampling date

The sampling day is the 24-hour period from noon of the first day to noon the following day, and is identified by the calendar date corresponding to noon on the first day.

Fish numbers

Fish should be sequentially numbered, beginning with 1 each sampling event. By starting with 1 each sampling event, it is possible to track how many fish have been sampled. Five fish are typically placed on each slide.

Figure 1.–Properly labeled smolt slide.

Sample ASAP

Sample smolt as soon as possible after they are captured to minimize mortality.

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Mix anesthetizing solution

Wearing latex gloves to prevent direct exposure to the anesthetic, dissolve a small amount (approximately of 1 g) of Tricane Methanesulfate (MS-222) and baking soda in about 2 L of cold water in a dish pan. The amount of anesthetic needed will vary depending on the water temperature, freshness of the chemical, and size of the smolt.

Set up recovery bucket

Set up an additional bucket of water to be used as a recovery bucket. This bucket should be filled with fresh water, aerated, and covered to avoid stress on the fish.

Transport smolt to sampling area

Transport smolt, using clean 5-gallon buckets, to the sampling area. Buckets containing smolt should be filled with fresh water, aerated, and covered to avoid stress on the fish. Fish can be placed into the bucket using a dip net, or by dipping the bucket into the live box.

Anesthetize smolt a few at a time

Place a few smolt in the anesthetic solution until they become subdued to a point where they can no longer flex their axial musculature but can still ventilate their gills. The concentration of the solution should be such that it immobilizes the fish in 2–3 minutes.

Lightly dry preferred area

After the fish are anesthetized, carefully remove a fish from the dish pan and gently pat dry with a paper towel.

Sample smolt

Place the fish on its right side to sample the left side. Quickly and carefully take length (snout to tail fork) and weight measurements, and remove 5–10 scales from the preferred area of the smolt using a scalpel (Figure 2). The preferred scale is located where a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin crosses the second scale row dorsal to the lateral line. If scales are not present in this area then scales should be taken from the secondary location, which is the same area on the right side of the fish.
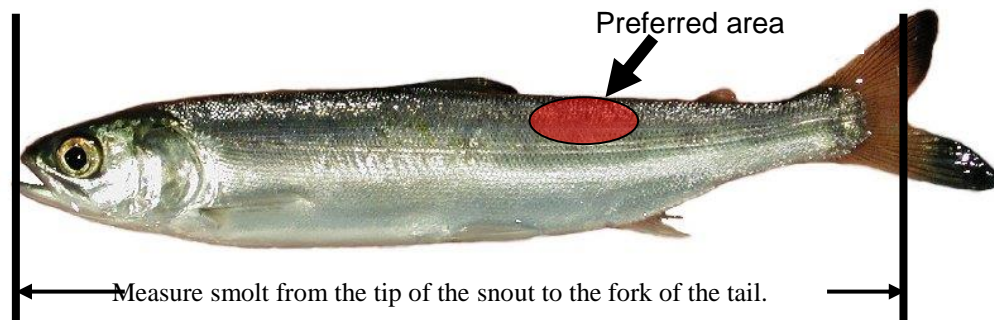
Figure 2.–Smolt with proper length measurement and preferred area highlighted.

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27

Move smolt to recovery bucket

Transfer sampled smolt from the sampling station to the recovery bucket. It is important to sample as quickly as possible and immediately place smolt into the recovery bucket to prevent mortality.

Align scales on slide

Using the dissecting probe, line up and spread out the scales on the slide under the correct fish number (Figure 1).

Clean sampling supplies

Wipe off the scalpel and dissecting probe to remove scales and slime before another smolt is sampled.

Continue sampling

Continue sampling smolt until sampling goals are met, or all available smolt have been sampled. Depending on how long it takes to complete the sample, the water in all buckets (holding, recovery, and anesthetizing) may need to be refreshed.

Release smolt

Once the sampled fish have recovered and are swimming normally in the recovery bucket, they should be released downstream of the trapping location.

Data Entry and Management

Data obtained while sampling is digitally recorded on a netbook computer or iPad using a browser (web) based application. The computer and iPad must be connected to the internet in the beginning of the season, or when an updated version of the application is launched in order to cache the application (this will be done prior to sampling kits being sent to the field). Internet will not be needed after the application is cached. A USB flash drive, SD card, or internet connection is used to save and transfer data from the netbooks or iPads located in field camps, to the office, throughout the season. Please note that the netbooks, iPads, and if you are using them AirStashs can only be charged with the provided AC power adaptors, so plan accordingly for generator use.

Netbook Computers

To begin using the netbook, turn it on by pressing the power button. The netbooks do not have passwords, so just press enter to log in. Using the trackpad or mouse, click on the Mozilla Firefox icon. After the icon is selected, the browser window will open. Please read "Browser Based (both Computer and iPad) Data Entry Specifics" on the following pages for the next steps necessary for entering data on the netbook.

iPad

To begin using the iPad, turn it on by pressing the power button (Figure 1). If the iPad is already on, press the home button (Figure 2). Slide your finger across the screen where it says "slide to unlock". The iPad screen is a touch screen, and works by simply touching your finger to the screen. It may now be necessary to enter a passcode. Enter the passcode (provided by project leader) by using the keyboard on the screen. After the passcode is entered you may be required to press "Done". Apps loaded on the iPad will now be visable. Using your finger on the touch screen of the iPad, click on the Safari icon located on the bottom of the screen. Please read "Browser Based (both Computer and iPad) Data Entry Specifics" on the following pages for the next steps necessary for entering data on the iPad.

Figure 1.–iPad power button.

Figure 2.–iPad home button.

Browser Based (both Computer and iPad) Data Entry Specifics

With the browser open (Mozilla for netbooks, and Safari for iPads), you will need to navigate to the appropriate mobile web application. These will be bookmarked for your convenience, but can also be accessed by typing the below address(es) into the toolbar of the browser.

Adult ASL Mobile Application- http://kodweb.fishgame.state.ak.us/apps/salmon/asl/mobile/

Smolt Mobile Application- http://kodweb.fishgame.state.ak.us/apps/salmon/smolt_asl/mobile/

There are six buttons on the menu screen of the data entry application. These are the same for the adult and smolt programs, and are Enter Background Info, Sample Next Fish, Review/Edit Fish, Upload Data, Delete All Data on this Device, and Configuration (Figure 3). Each of the buttons are discussed in detail below.
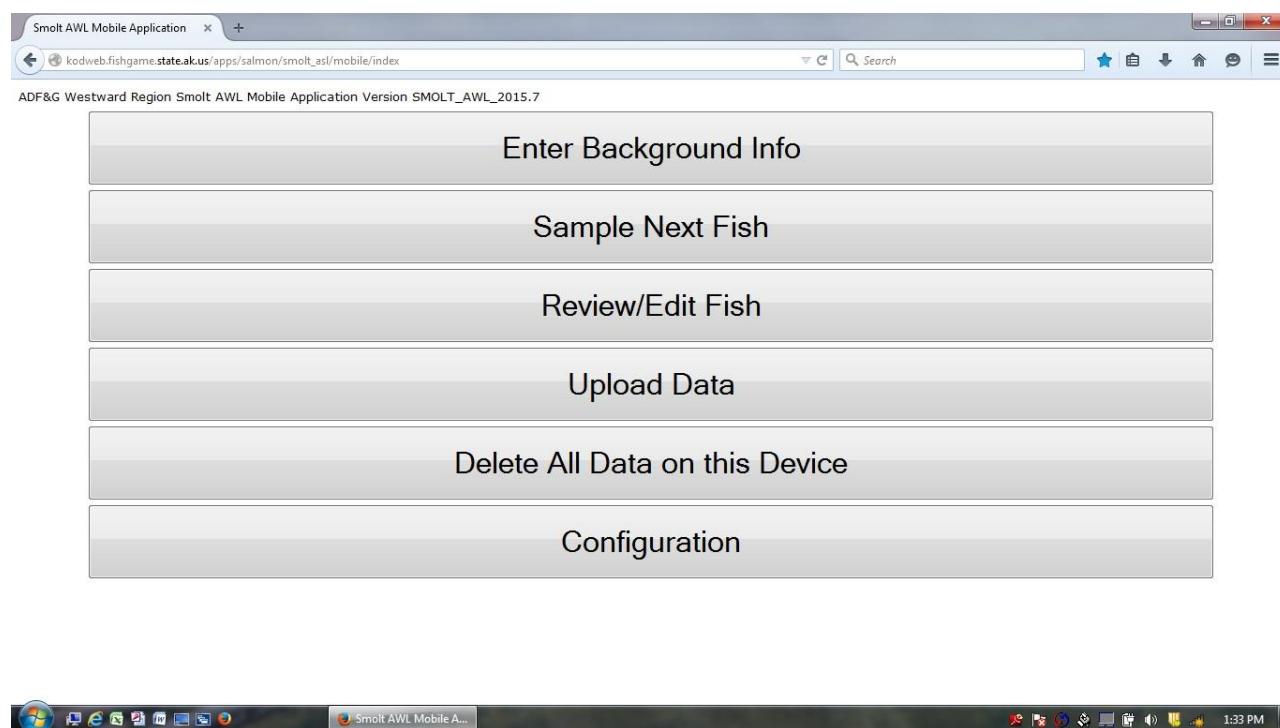

Figure 3.–Menu screen of adult and smolt mobile applications.

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Enter Background Info

Background information must be entered at the start of each sampling event. A new day always constitutes a new sampling event, so it will be necessary to "Enter Background Info" typically once per sampling day. For most projects, changing the background information each day will consist of updating the date only. It is important to edit background information when any change in sampling information occurs. The following topics constitute sampling information. If information in one of the following categories changes, it is necessary to change the background information. To enter background information click or touch the "Enter Background Info" button.

Species

Select the appropriate species from the buttons, such as Sockeye. When entering data, click on the green arrow button to move to the next screen.

Project (Adult Mobile Application ONLY)

Select the appropriate project. If there is confusion about which project to select, please contact your project leader before entering data.

Management Area (Mgmt Area)

Choose the relevant management area. Samples collected from Kodiak Island statistical areas must have Kodiak selected as the proper management area.

Area Sampled

Select the area that best represents where the fish were sampled, such as Ayakulik River.

Location Type

Indicate the type of area in which the fish were sampled. For example, if the fish were sampled at the Upper Station weir, choose Weir. In some instances, the following screen is a Location Id screen in which you would select your specific sampling location.

Gear Type

Select the type of gear in which the fish were caught, such as Trap.

Measurement Type

Designate the type of length measurement taken. Adult salmon lengths are typically measured from mid-eye to tail fork.

Sample Date

The mobile applications will default to the current day. For adult escapement sampling the date the fish are sampled should be entered. Adult catch samples should have the date the fish were caught, even though this commonly differs from the sample date. Since smolt are collected in the middle of the night, the smolt sampling day is the 24-hour period from noon of the first day to noon the following day, and is identified by the calendar date corresponding to noon on the first day. The first day is the date that should be entered.

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Sampler Initials

Enter the initials of the sampling crew.

Sample Next Fish

After entering background information, the individual fish data is entered. The Sample Next Fish button is used to enter the details of each fish sampled. After entering the background information, the form automatically transitions to the sample next fish section of the application. As you continue to sample, simply tap the green arrow button to enter individual fish data. This option is used when continuing to the next fish of a sample where no background information has changed. Fish data that is entered here is associated with the current background information logged. The following constitute fish data and should be entered for each fish.

Card Number or Scale Slide Number

Scale (gum) cards or slides are numbered sequentially by date throughout the season starting with 1. A separate numbering sequence will be used for each species or major location change. Consult your crew leader for the current card or slide number. It is crucial to make sure the number written on the scale card or slide matches the scale card or slide number entered into the mobile application. When sampling adults, the Scale card number will automatically advance to the next number after fish number 40 is recorded. When sampling smolt, the Scale card number will automatically advance to the next number after fish number 40 is recorded.

Fish Number

The fish number is the number of the fish on a particular scale card or slide. This must be a number between 1 and 40. By default, the fish number will automatically advance after each fish is sampled. It will also automatically go from 40 to 1.

Sex (Adult sampling ONLY)

If given the option, select the sex of the fish.

Length

For adults, enter the length of the fish from mid-eye to tail fork in millimeters. For smolt, enter the length of the fish from tip of the snout to the tail fork in millimeters. If for some reason you do not collect a length measurement, enter 999.

Weight (Smolt sampling ONLY)

If given the option, enter the weight of the smolt in grams.

Fin Clip

Indicate the type of fin clip (e.g., axillary process) or enter None

Tag Color

If given the option, select the appropriate tag color.

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Vial Number or Genetics Number or Tag Number

If given the option, enter the appropriate vial, genetics, or tag number.

Review/Edit Fish

The Review/Edit Fish button is useful for checking data that was previously entered or for editing data incorrectly entered into the mobile application. To review and edit the data entered, use the four buttons on the top of the screen (First Fish, Prev Fish, Next Fish, and Last Fish). These buttons are used navigate to the fish you would like to investigate. The card number, fish number, sex, and length of each fish are visible at the top of the screen. To go through all of the information entered for a fish, navigate to the Card and Fish using the summary at the top of the screen, and click through the data entered using the green arrow button (this appears similar to entering data using the Sample Next Fish button). The fish data previously entered for that fish will be filled into the fields.

If fish data needs to be edited, change the field that needs to be updated and use the green arrow to finish entering data for that fish. After the fish is edited, press the Menu button to return to the menu screen. New fish may be entered by pressing the Sample Next Fish button, or the data may be saved to a .csv file using the Upload Data button (see next section).

Upload Data

After each sample, a .csv file should be created and saved on a USB flash drive, SD card, or saved and emailed if internet access is available. The steps for creating and saving .csv files on the netbooks and iPads are slightly different, and are outlined in the following two sections.

Netbook

To save a file press the Upload Data button on the menu screen of the mobile application. You will almost always upload all of the data from the beginning of the season, so leave the Start Card and End Card fields blank. Press the Upload button. A window will pop up which allows you to open and/or save the file. If "Open with Microsoft Office Excel (default)" is selected, the csv file will open in Microsoft Office Excel. Do not edit data on the CSV file, or it may corrupt the file which would make loading difficult or impossible. Click on the Microsoft office button (Figure 4) and use the drop down menus to select Save As, Other Formats. If the Microsoft Office button is not visable, the netbook may have an older version of excel, and you will need to select File, Save As, and highlight .csv from the file types. Navigate to the folder in which the data is being saved. Type in the file name (in the following format: Area_Sampled_YYYYMMDD.csv, e.g., Afognak_River_20150614.csv), make sure the Save as type is csv (Comma delimited), and press the Save button. An excel window may pop up stating that the file may contain features that are not compatible with csv, and ask if you want to keep the workbook in this format. Always select yes.

Figure 4.–Microsoft Office Button.

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The file then needs to be saved onto a USB flash drive, SD card or emailed. Up to date data should be sent into the main office as often as possible (e.g., with the grocery plane). To save onto a USB flash drive or SD card, insert the flash drive or card into the appropriate port on the netbook. Double click on MyComputer, which is found on the desktop of the netbook. Navigate to the folder where your data is saved and highlight the most recent file (determined by the date) by single clicking. With the file highlighted, click on edit at the top of the window and then copy. Open up MyComputer and double click on the USB flash drive or SD card (often called Removable Disk) found under the heading Devices with Removable Storage. Click on edit at the top of the window, and then paste. The .csv file that was copied earlier will appear in the window indicating it was copied to the storage device. Exit out of all windows and single click on the safely remove hardware button on the bottom right corner of the desktop in the quick start menu. Click on Safely remove USB Mass Storage Device, or Eject SD Card. A pop-up will verify that it is now safe to remove the hardware. Files can also be emailed by logging into an email program, attaching the previously saved .csv file, and sending to the project leader or michelle.wattum@alaska.gov.

iPad

To save a file press the Upload Data button on the menu screen of the mobile application. You will almost always upload all of the data from the beginning of the season, so leave the Start Card and End Card fields blank. Press the Upload button. A preview of the file that is being saved will display. Tap the top of the screen, and Open in "AirStash+" will appear in blue letters on the top of the screen. Tap on Open in "AirStash+" to save a .csv file of the data to the AirStash+ App. The file will say Unknown and will have the date and time it was created. This app will be used to either email the file, or to save to an SD card using a handheld AirStash+ Device. Instructions for emailing data and saving the data to the AirStash are found below.

Emailing

Files can be emailed if internet access is available. In the AirStash+ app, a list of saved files is visible on the left hand side. To email the file click on the desired file (using the date and time), to open a preview of the data. On the top right hand side of the screen, click on the share button and then the mail button (Figure 5). Type the recipient into the To: field and tap Send in the top right hand corner of the screen.

Figure 5.–Share (left) and mail (right) buttons on iPad.

-continued-

34

AirStash to SD Card

Data is moved from the iPad to an SD card using a handheld device called an AirStash (Figure 6). To save data onto an SD card using the AirStash, make sure an SD card is inserted into the port of the AirStash, and that the AirStash is turned on. Press the green power button to turn the AirStash on. A green flashing light will indicate that the AirStash is functioning.

Figure 6.–AirStash.

The AirStash will create a wireless network for you to transfer data with. To connect to the AirStash wireless network press the Settings button on the main menu of the iPad (Figure 7)

Figure 7.– Settings icon on main screen of iPad.

Tap "Wi-Fi" on the left hand side of the settings screen. On the right hand side of the screen under CHOOSE A NETWORK… The AirStash will be visible (Figure 8). Tap on the AirStash to connect to the network. The AirStash will move under Wi-Fi at the top of the screen, and will have a blue check mark to the left of the identifier to show that the iPad is connected.

Now that the iPad and the AirStash are connected via the AirStash Wi-Fi, the data can be moved to the SD card. To move the data, open the AirStash+ app. Under Inbox, tap Copy To AirStash at the bottom of the screen. It is now possible to select the desired files for copying. Tap the file or files (a blue check mark will appear by chosen files) and press Copy on the bottom right side of the screen. A pop-up will appear alerting users to the status of the copy. When the Copy is completed, the box will let you know that the copy was complete, and allow users to close out of the window. The file is now on the SD card (under the Copied from Inbox folder).
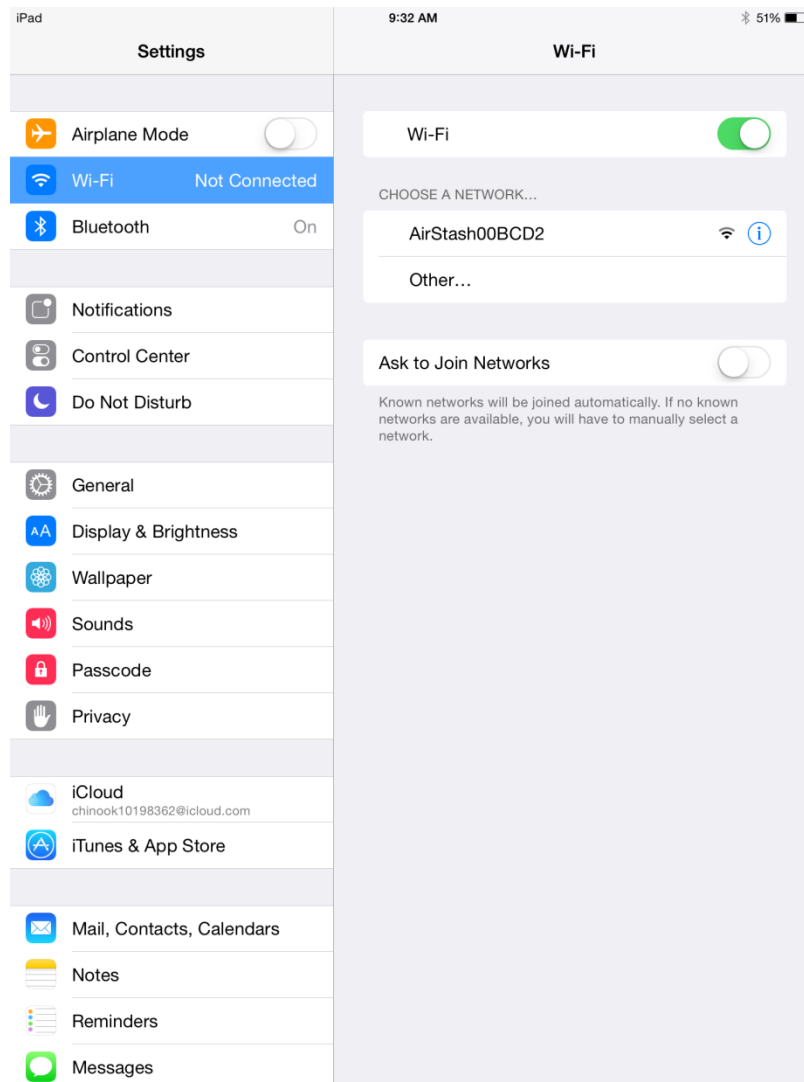
-continued-

Figure 8.–Settings menu of the iPad.

Delete All Data on this Device

This button should only be used at the beginning of the season when practicing using the program, or when told to do so by the project leader. All data on the device will be deleted, without a recovery method if the user elects to delete the data.

Configuration

In general, it will not be necessary for users to access the configuration button. If problem arise with uploading a user can double check that the upload mode selected is Save File on This Device, and that the Font and Style is set to normal. If you accidently press this button, select Menu to go back to the home screen without making any changes.

-continued-

Notes and Reminders

- If a mistake is noticed before moving onto the next fish, the back arrow button can be used to make changes without having to go to the Review/Edit Fish portion of the program.

- Each length, sex, and scale must correspond to a single fish! It is the responsibility of the crew leader to be sure the data has been entered correctly.

- Never put data from different dates onto one gum card, and always enter new background information. Even if only one scale is collected that day, enter new background information and begin a new gum card the next day.

- Be careful when collecting and mounting scales in wet conditions (rain, high humidity, etc.). If glue dries on top of the scale, it often obscures scale features, resulting in an unreadable scale. In addition, scales frequently adhere poorly to a wet gum card. Protect the cards and keep them dry to avoid having to remount the scales on a new card. If the cards get wet, try to dry them in a protected area or remount if necessary. Use a pencil when filling out gum cards, because ink will come off during pressing.

- Responsibility for accuracy lies first with the primary data collector(s) and finally with the crew leader. Sloppy or incomplete data or gum cards will be returned to individual collectors for correction.

- Ensure that all equipment is well kept. Electronics should be stored in a clean safe place.

- If a mistake is realized during a sample, it may be easiest to document the mistake and send the correction in with data file for the Kodiak office to fix. Familiarity with the loading program and CSV files can make for quick fixes in the office, that may be time consuming or result in errors if done in the field.

- The mobile application is cached in the browser on both the iPad and Netbooks. If you delete or clear the cache, the program and all the data will be erased. DO NOT CLEAR THE CACHE. On the iPad the cache is cleared in the Settings > Safari > Clear History and Website Data. On the netbook in the Firefox window the cache is cleared in History > Clear Recent History. Do not use these functions unless told to do so or your device may not function.

- The AirStash needs to be charged. It can be charged by placing the AirStash in the USB port of the iPad charger. A flashing yellow light will indicate that the AirStash is charging.